REMARKS

Claims 1 to 9 and 11 to 21 continue to be in the case.

The Office Action refers to Claim Rejections - 35 USC§ 112.

1.

Claims 1-9, 11-12 and 17-21 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The state of the art relating to fieldbuses is set forth in US Patent 5,978,850 to Ramachandran et al., column 1, line 14 to column 2, line 9. The reference Ramachandran et al. teaches what a fieldbus is, how fieldbus networks work, and which blocks are present in a fieldbus.

The present specification refers to a fieldbus but does not specify what kind of fieldbus is concerned. Paragraph 2 of the instant application in US 2007/0124111 A1 refers to " fieldbus physical layer characteristics". This language is a clear indication that the fieldbus of the present application is of a type set forth in United States Patent 5,978,850 or in International standard IEC61158-2.

Paragraphs 3 and 5 furthermore indicate that the nature of the present fieldbus is the same as that of United States Patent 5,978,850 or of International standard IEC61158-2.

The simultaneous presence of common mode and differential mode signal injection and/or signal detection points according to paragraph 2 is a strong indicator that the fieldbus of the present application is the same as that in United States Patent 5,978,850 to Ramachandran et al. or in International standard IEC61158-2.

Applicants are canceling the objectionable language from the claims in the present amendment.

The specific recitation of any one standard of fieldbuses including "IEC61158-2", "Foundation Fieldbus HI", "Profibus PA", "IEEE 802 Ethernet", and "ITUG.99x.x DSL" are not mentioned or suggested by the originally filed application as either examples or preferred embodiments of the invention.

Applicants are striking the objectionable language.

2.

Claims 1-21 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, claims 1, 13, 20 and 21 contain the language "adapted to" which has been deemed to be indefinite functional or intended use language. Applicant is encouraged to amend the claims to functionally describe the structure which enables this functionality if it is not inherent.

The present amendment strikes the language "adapted to" from claims 1, 13, 20, and 21 and substitutes the language –formed -- or – connected -- therefore.

3. Claims 1-9, 11-12 and 17-21 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, claims 1, 20 and 21 include reference to standards such as "IEC61158-2". Although theses are well understood standards in the art, they are indefinite as they are not static in time. For example, a review of the IEC standards website reveals that the "IEC 61158-2" standard is continually reviewed, updated and changed making its use in the claim indefinite.

The standards are those which were in force when the present application was filed.

The Office Action refers to Claim Rejections - 35 USC§ 102

4. Claim 13 stands rejected under 35 U.S.C. 102(b) as being anticipated by Scecina (US pat 5511223).

The Office Action of February 26, 2008 did not only reject claim 13 over the Scecina et al. reference, but also Claims 1-2, 7-9, 11-12 and 20 were rejected under 35 U.S.C. 102(b) as being anticipated by Scecina et al. (USpat5511223). The present amendment considers not only the rejection under Scecina et al. of claim 13 on July 29, 2008, but also the rejections under Scecina et al. of February 26, 2008 of claims 1-2, 7-9, 11-12 and 20, since the present amendment returns these claims to their form on February 26, 2008 and since it appears very probable that the rejections under Scecina et al.of February 26, 2008 will otherwise be revived in the next Office Action.

With respect to claim 1 and 13, Scecina discloses an apparatus comprising:

1) A modular fieldbus board (Fig 1) comprising a number of fieldbuses (Fig 1 item 40 is the fieldbus module, Fig 5 item 18 shows the fieldbus board itself) connected to a bulk power supply (column 3 lines 64-67).

Applicants respectfully disagree.

The Office Action talks about a modular fieldbus board. The reference Scecina et al. in column 6, lines 39 to 42 instead refers to a module which contains a field bus board as follows: "A field bus board 18 and a digital bus board 19, both containing connector halves 18a and 19a, are vertically situated at opposite ends of the module.". Therefore, the field bus board 18 of the Scecina et al. reference is not modular, but instead is part of the module 40.

There is nothing in the reference Scecina et al. which says that the field bus board 18 contains a number of field buses. According to the reference Scecina et al. in column 7, lines 16 and 17: "Process signals come from the field directly to the module..". If according to the Scecina et al. reference the process signals come from the field directly to the module 40, then the process signals from the field will not go through an additional field bus.

The reference Scecina et al. fails to teach any two or more field buses, only a field bus board 18 is taught without any explanation what is meant by "field bus board".

The reference Scecina et al. in column 3, lines 64 to 66 refers to "connections to power (signals) and process signals", that is to connections and not to a bulk power supply as claimed by the applicants.

2). A diagnostic system (Fig 1 item 50 and Fig 4) comprising a monitoring transceiver means (Fig 4 items 12-15) connected to two or more of the number of fieldbuses (Fig 1 items 40) by means of two or more signal injection and/or signal detection points, wherein the points are adapted to inject and/or detect both common mode and differential mode signals (abstract.

Applicants respectfully disagree.

The reference Scecina et al. fails to teach "a monitoring transceiver means" as required in claim 1 of the present application, there is only a test rack 50 shown by the Scecina et al. reference. According to the reference Scecina et al., column 5, lines 41 to 49: "The invention includes a method for switching between process

signals which are input during normal operation and test signals which are input to verify the operability of the module. The design is illustrated in FIG. 4 . The testing means consists of signal switching devices 9, 10, and 22 which are contained in the module 40, and test signal generating device 12 and test control device 13 which are external to the module.". Thus all that what the reference Scecina et al. teaches to test is the "operability of the module".

The reference Scecina et al. further teaches in column 5, lines 28 to 30 : "The invention thus provides an electronic means for verifying that a digital module is installed in the correct location in a system rack.". Thus the test rack of the Scecina et al. reference verifies if a module is properly located in a rack. In clear contrast, claim 1 of the present application requires that "which points are located between the bulk power supply and a fieldbus trunk part of the fieldbus, such that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points, and in which the monitoring transceiver means is provided with a first digital and/or analog interface separate from the fieldbus trunk, and adapted to transmit diagnostic data detected by the monitoring transceiver means directly to an associated digital or analog device.". In other words: the injection and detection points are located between the bulk power supply and the fieldbus trunk part of the fieldbus according to the present invention. The monitoring transceiver means of

the present invention detects one or more fieldbus physical layer characteristics between two of the two or more of said points. Furthermore, the monitoring transceiver means is provided with a first digital and/or analog interface separate from the fieldbus trunk according to the present invention.. Said digital and/or analog interface is connected to transmit diagnostic data detected by the monitoring transceiver means directly to an associated digital or analog device in clear contrast to the construction of the Scecina et al. reference.

While claim 1 of the present application requires "that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points", there is no teaching in the Scecina et al. reference that a monitoring transceiver means detects the physical layer characteristics of a fieldbus.

The reference Scecina et al. in column 5, lines 41 to 44 includes a method for switching between process signals, which are input to the module 40 during normal operation and test signals which are input to verify the operability of the module for verifying that the digital module is installed in the correct location in the system rack.The testing means of the reference Scecina et al. consists of signal switching devices 9, 10, and 22, which are contained in module 40, and test signal generating device 12 and test control device 13,

which are external to the module 40. Therefore, the module 40 itself is being tested according to the reference Scecina et al.

The reference Scecina et al. neither specifically tests the field bus board 18 nor of the digital bus board 19 nor the printed circuit boards 20. This omission from testing makes sense for the reference Scecina et al. (column 2, lines 55 to 57; column 5, lines 28 to 30) because the testing only shall verify that a module 40 is installed in the correct location in a system rack.

According to the reference Scecina et al., column 5, line 63 to column 6, line 5, the test signal (T1) performs a checking of the processors 1 and 2 for proper response to the test input signal.

Therefore, the reference Scecina et al. does not include a signal injection and/or signal detection point, wherein the points are adapted to inject and/or detect common mode or differential mode signals. Apparently, the reference Scecina et al. is not interested in detecting and counterbalancing or go against common mode signals or against differential mode signals. Likewise the wordings "differential mode" or "differential mode noise" or "differential mode signals" do not exist neither in the whole description nor in the claims of Scecina.

Therefore, the reference Scecina et al. does not teach monitoring transceiver means connected to one or more of the number of fieldbuses as required in claims 1 and 13 of the present application..

.According to the knowledge of one of ordinary skill in the art, any two-cable communication line is "adapted to" inject and/or detect such signals. Common mode is simply the average of the two line signals and thus both exist at the same time), and wherein the points are interposed between the bulk power supply and the fieldbus trunk, such that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points (Figs 4 and 5).

Applicants respectfully traverse.

There are no common or differential mode signal injection and detection points taught in the Scecina et al. reference. There is also no location given in the Scecina et al. reference for any signal points. There is no field bus trunk or fieldbus power supply taught in the Scecina et al. reference. There is no suggestion whatsoever in the Scecina et al. reference as to any fieldbus physical layer existing or that the monitoring transceiver means would detect fieldbus physical layer characteristics.

As pointed out by the sheet "Differential and Common Mode Noise" noise is classified into two types according to the conduction mode. The first type is differential mode noise, which is conducted on the signal (VCC) line and GND line in the opposite direction to each other. The second type is common mode noise, which is conducted on all lines in the same direction. With an AC power supply line, for example, noise is conducted on both lines in the same direction. With a signal cable, noise is conducted on all the lines in the cable in the same direction.

It's an important feature of the invention to detect both common mode and differential mode signals and to counterbalance and to eliminate such signals. This is clearly shown in figure 1 of the present application: the common mode signal injection and detection points 2, 4 and 6 are drawn as ellipses, which clasp both of the lines of the two-wire line, connected to the bulk power supply 1. The reason is, because common mode signals are conducted on all lines in the same direction.

The differential mode signal injection and signal detection points 7 are drawn, however, as ellipses, which clasp always only one of the lines of the two-wire line, connected to the bulk power supply 1. The reason is, because differential mode signals are conducted on the signal (VCC) line and GND line in the opposite direction to each other.

On the contrary, the reference Scecina et al. teaches two ways for the use of the architecture of the processors 1 and 2. In normal mode the signals IN1 are processed to the two processors 1, 2. After switching to the test mode the test signals T1 are also processed in the two processors 1, 2. A main feature of the reference Scecina et al. is to make available the two processors in each module, with connected logic for producing redundant signal processing and for creating a trip output when faults are detected either in the process or in the functioning of the module.

3) A first digital and/or analog interface separate from the field bus trunk and adapted to transmit diagnostic data detected by the monitoring transceiver means directly to an associated digital or analog device (Fig 1 item 82 vs. "test cable and connector" which is the "fieldbus trunk").

It should be noted again that the reference Scecina et al. does not teach a fieldbus trunk, although such fieldbus trunk is required according to claim 1 of the present application. There is nothing in the reference Scecina et al. about transmission of diagnostic data detected by monitoring transceiver means directly to an associated digital or analog device.

According to the reference Scecina et al., column 4, lines 4 to 7 “A data bus 82 is used for communications between the modules and the auxiliary equipment. The databus handles test command and data signals only”.

There is no teaching or suggestion in the reference Scecina et al. that the data bus 82 is a field bus. In addition, the reference Scecina et al. teaches in column 6, lines 39 to 42: “A field bus board 18 and a digital bus board 19, both containing connector halves 18a and 19a, are vertically situated at opposite ends of the module.”. No connection is taught by the Scecina et al. reference as to any connection between data bus 82, field bus board 18 and digital bus board 19 and none of these three elements is connected to a fieldbus.

The reference Scecina et al. states in column 4, lines 7 to 9 that: “A removable cable and connector assembly is used for connecting test input and output signals between the test rack and the module.”. The allegation in the Office Action that the “test cable and connector” is the “fieldbus trunk” is not supported by the Scecina et al. reference. Instead the Scecina et al. reference is silent to the “test cable and connector” being a fieldbus trunk. A field bus trunk is not recited in

the Scecina et al. reference, only a field bus board 18. The Scecina et al. reference in column 5, lines 41 to 45 states that switching between process signals which are input during normal operation and test signals, which are to verify the operability of the module, but does not mention that the “test cable and connector” is to be a “fieldbus trunk”.

In figure 1 of the reference Scecina et al., the item 82 does not show a fieldbus trunk, but only a data bus to connect the modules with a test rack and a maintenance workstation. According to the reference Scecina et al., column 4, lines 4-12, a data bus 82 is used for communications between the modules and the auxiliary equipment. The data bus handles test command and data signals only. A removable cable and connector assembly is used for connecting test input and output signals between the test rack and the module. No permanent connection between the module and the test rack or test control device is required during normal (non-test) operation.

In contradistinction, the present invention creates a diagnostic system for a modular fieldbus board carrying a number of fieldbuses, which are permanently connected to the fieldbus trunk (see PCT/GB2004/004077, s.4, 1.15-19; US patent application 2007/0124111 A1, paragraph 0020). Each fieldbus trunk is always connected to one or more field devices. All common mode signal injection and detection points and all differential mode signal injection and signal detection points

also are permanently connected to each field bus trunk (see PCT/GB2004/004077, s. 4,1.25-31, s. 5,1.1-2; US patent application 2007/0124111 A1, paragraph 0022).

Therefore it is not permissible to compare the <u>removable</u> cable and connector assembly according to the reference Scecina et al., column 4, line 7 of data bus 82 with the field bus trunks of the field bus technology of the present invention.

In the following the rejections of claims 2, 7, 8, 9, 11, 12, 20 over the Scencina et al. reference are considered.

With respect to claim 2, Scecina discloses the fieldbus physical layer characteristics comprise one or more of: over/under termination, noise/ripple level, signal level, signal bias, signal jitter, signal ringing, signal distortion, signal attenuation, cross talk, unbalance, and earth leakage (column 4 lines 21-50).

Applicants respectfully traverse.

The Office action alleges that the reference Scecina et al. in column 4, lines 21 to 50 teaches that the fieldbus physical layer characteristics comprise one or more of: over/under termination, noise/ripple level, signal level, signal bias, signal jitter, signal ringing, signal distortion, signal attenuation, cross talk, unbalance, and earth leakage. However, applicants cannot find the words "fieldbus physical layer characteristics", over/under termination, noise/ripple level, signal level, signal bias, signal jitter, signal ringing, signal distortion, signal attenuation, cross talk, unbalance, and earth leakage." in the section column 4, lines 21 to 50 of the reference Scecina et al. recited in the Office Action. Clarification is respectfully requested.

Regarding the statements in the Office Action with respect to claim 2 of the present application, it needs to be pointed out, that the reference Scecina et al., column 4, lines 21-50 does not teach the requirements of claim 2 of the present application. The reference Scecina et al., column 4, lines 18-20 only teaches, that, *due to the diverse processor hardware, the design reduces the susceptibility of the module to common mode failures*. This is a completely general statement without any specifically technical relationship.

With respect to claim 7, Scecina discloses a first digital and/or an analogue interface, is adapted to receive operating commands from an associated digital or analogue device (Fig 1 item 60 and claim 2).

Applicants respectfully disagree.

Claim 7 requires that "the first digital and/or analog interface is adapted to receive operating commands from an associated digital or analog device."

The reference Scecina et al. in column 4, lines 1 to 4 writes: "Auxiliary equipment required for testing the modules as described herein and for changing tuning and setpoint constants in the modules may also be located in equipment racks 50 and 60 in the system cabinets.". Apparently, the allegation in the Office Action is that the rack 60 is the first interface or the associated device. However, applicants urge that a rack does not perform the functions of an interface or of an associated electronic device.

Claim 2 of the Scecina et al. reference does not teach " a first digital and/or analog interface", "receive operating commands ", and "an associated digital or analog device", while these elements are clearly required in claim 7 of the present application. Therefore, claim 7 of the present application patentably defines the present invention over the reference Scecina et al.

Fig. 1, item 60, shows an equipment rack 60 of the reference Scecina et al., column 4, lines 3-4, like the equipment rack 50 of the reference Scecina et al., column 4, lines 3-4). The reference Scecina et al., claim 2 (column 8, lines 19-28) does not teach monitoring transceiver means provided with a first digital and/or an analogue interface, such that diagnostic data detected and/or alarms created by the monitoring transceiver means in use are transmitted to a digital or analogue device operated by a user, and such that commands are sent while in use from the user operated digital or analogue device to operate the monitoring transceiver means.

But the reference Scecina et al., claim 2 (column 8,lines 19-28) teaches that at least one digital module comprises a field bus board (in which sense whatsoever) at a rear end of said module for analog signals, a digital bus board spaced from said field bus board at a front end of said module for digital signals with a plurality of printed circuit boards connected between said field and digital bus boards, with connection means connected to said field bus board and constructed to connect into a receptacle

in a module rack, and front panel means for displaying information concerning said module.

Also the reference Scecina et al. teaches an interface, but Fig. 1, item 60, shows an equipment rack 60 of the reference Scenica, column 4, lines 3-4 without closer specification. This is not the monitoring transceiver means of the present invention.

With respect to claim 8, Scecina discloses a second digital and/or an analog interface, such that diagnostic data detected and/or alarm created by the monitoring transceiver means during use are transmitted to other associated diagnostic systems (Fig 1 item 60 this workstation is another system associated).

The element 60 of the reference Scecina et al. is a rack. The MAINTENANCE WORKSTATION is connected to the databus 82 of the Scecina et al. reference. The second interface such that diagnostic data detected or alarm created by the monitoring transceiver means are transmitted are not seen in the reference Scecina et al..

With respect to claim 9, Scecina discloses a visual means to display diagnostic data (Fig 1 item 60 and claim 2). "Provided with" is not limited to "integral to".

Rack 60 of the reference Scecina et al. is certainly no display or visual means. Claim 2 of the Scecina et al. reference writes: "front panel means for displaying information concerning said module.". In contradistinction, claim 8 of the instant application requires that visual means display diagnostics..

With respect to claim 11, Scecina discloses that the monitoring transceiver means is connected to the bulk power supply (column 3 lines 64-67).

Claim 11 requires that the monitoring transceiver means are connected to the bulk power supply. The reference Scecina et al. states in column 4, lines 64 and 65: “connections shown at 42 in FIG. 5, to power (signals) and process signals are established”. Applicants respectfully submit that having a monitoring transceiver means connected to a bulk power supply as the present application does is clearly different from connections to power signals as provided by the Scecina et al. reference.

With respect to claim 12, Scecina discloses signal detection points are disposed within hardware carried on the board (Fig 5).

The allegation of the Office Action with respect to claim 12 is in conflict with what the reference Scecina et al. writes in connection with FIG. 5 in column 6, lines 39 to 67, where no reference is seen to any signal detection points.. Therefore claim 12 patentably distinguishes over the reference Scecina et al..

Fig. 5 of the reference Scecina et al. does not show any signal detection points. It is not seen where such points should be located:

Item 18 is named field bus board

Item 19 is named digital bus board

Item 20 is named horizontal PC boards

Item 18a, 19a, 20a and 20b is named connector halves

Item 21 is named plugging board.

Therefore the reference Scecina et al. does not show the features of claim 12 of the present application and therefore the reference Scecina et al. does neither anticipate nor render obvious claim 12 of the present application.

As to claim 20, Scecina discloses an apparatus comprising:

1) A bulk power supply (Figs 1 and 5 and column 3, line 58 - column 4, line 7).

Applicants respectfully disagree.

Fig. 1 of the Scecina et al. reference does not show any bulk power supply.

Fig. 5 of the Scecina et al. reference does not show any bulk power supply.

As set forth above, the Scecina et al. reference in column 3, lines 64 and 65 refers to connections to power signals and not to a bulk power supply. Column 4, lines 6 and 7 of the Scecina et al. reference reads as follows: "The data bus handles test command and data signals only.". One can only conclude that the data bus is not connected to a bulk power supply.

2) A plurality of fieldbuses (Fig 1 item 40) including a fleldbus trunk (Fig 1 item "test cable and connector" and all power connections shown in Fig 5) and connected to the bulk power supply (Fig 1). Without power the apparatus would not function.

Item 40 of Fig. 1 of the Scecina et al. reference is not a plurality of fieldbuses, but a module and according to column 6, lines 39 to 65 a module comprises a field bus board 18, a digital bus board 19, and printed circuit boards 20. A "field bus board" does not necessarily contain fieldbuses, such field bus board may only connect to some field bus just as a device or be a converter into analog signals. Alternatively, a field bus board could refer to a bus board, which has some connection with a field.

According to the Scecina et al. reference, column 4, lines 7 to 9: "A removable cable and connector assembly is used for connecting test input and output signals between the test rack and the module.". Nothing is stated in the Scecina et al. reference that the removable cable would be a fieldbus.

3) Two or more signal injection and/or signal detection points, wherein the points are adapted to inject and/or detect both common mode and differential mode signals, and wherein the points are interposed between the bulk power supply and the fieldbus trunk (Fig 5 shows connections for all such test and response signals. See above comments in claims 1 and 13 concerning "common mode and differential mode signals").

No signal injection and/or detection points are seen in Fig.5 of the Scecina et al. reference. The Scecina et al. reference fails to teach or suggest a bulk power supply and/or a fieldbus trunk..

4) A diagnostic system comprising monitoring transceiver means connected to two or more of the plurality of fieldbuses by means of two or more signal injection and/or signal detection points, such that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points (Fig 1 item 50).

Applicants respectfully submit that the Scecina et al. reference does not teach or suggest any fieldbuses. Here is also no monitoring transceiver means taught in the reference Scecina et al. According to the Scecina et al. reference, column 7, lines 17 and 18:"The module contains internal relays for switching between process and test inputs." And thus no monitoring and/or transceiving is contemplated in the Scecina et al. reference.. Since there are no fieldbuses taught in the Scecina et al. reference, there are also

no fieldbus physical layer characteristics between two or more of such points to be investigated.

The Office Action refers toClaim Rejections - 35 USC§ 103

5.

Claim 13 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Eryurek (US pat 6859755) in view of DelaCruz (US pat pub 20040073402).

The rejection is respectfully traversed.

With respect to claim 13, Eryurek discloses an apparatus comprising:

1) A modular fieldbus board (Fig 1 item 18) comprising a number of fieldbuses (Fig 1 items 20 and Fig 2 each of which is a fieldbus unit in loop 18) connected to a bulk power supply (Fig 2 item 30).

The reference Eryurek states in column 2, line 65 to column 3, line 1: "Process communications loop 18 is a fieldbus process communications loop and is coupled to field devices 20, which are shown coupled to process communications loop 18 in a multi-drop configuration.". Thus there is only a single fieldbus in the reference Eryurek contrary to the allegation in the Office Action.

The reference Eryurek states in column 3, line 10 to column 3, line 13: "Power module 30 receives electrical energy from process communication loop 18 and provides power to all components of field device 20 as indicated by arrow 40 labeled 'to all'". Thus power module 30 of the Eryurek reference receives

electrical energy from the process communication loop 18 and therefore canot be considered to be a bulk power supply.

A diagnostic system (Fig 2 item 36) comprising a monitoring transceiver means (Fig 2 item 32) connected to two or more of the number of fieldbuses (Fig 1 items 20) by means of two or more signal injection and/or signal detection points, wherein the points are adapted to inject and/or detect both common mode and differential mode signals (According to the knowledge of one of ordinary skill in the art, any two-cable communication line is "adapted to" inject and/or detect such signals. Common mode is simply the average of the two line signals and thus both exist at the same time), and wherein the points are interposed between the bulk power supply and

the fieldbus trunk, such that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points (Fig 2).

The reference Eryurek et al. teaches only a single process communication loop 18 of a single fieldbus. According to the Eryurek et al. reference, column 3, lines 28 to 30: “Diagnostic circuitry 36 is coupled to controller 34 and to process communication loop 18 as indicated by broken line 42.”. Whereas the monitoring transceiver means 17 of claim 13 of the instant application is connected to one or more of the number of fieldbuses by means of two or more common mode and/or differential mode signal injection and/or signal detection points, such that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points.

2)A first digital and/or analog interface separate from the field bus trunk and adapted to transmit diagnostic data detected by the monitoring transceiver means directly to an associated digital or analog device (Fig 2 item 32, for isolation, or Fig 4 item 206 also for isolation and separated monitoring communication).

The field device of the reference Eryurek et al. includes diagnostic circuitry adapted to measure a diagnostic characteristic related to a digital process control and measurement system.

A main difference of the reference Eryurek et al. versus the present application is firstly that each field device 20 of the reference Eryurek et al. must have a diagnostic circuitry 36. Referring to the present application there is always one diagnostic system for <u>all field devices</u>. The reference Eryurek et al. teaches that the number of field devices is the same as is the number of diagnostic circuits 36. This naturally is a great disadvantage of the reference Eryurek et al..

Secondly the reference Eryurek et al. only can detect differential mode signals. This is the case because diagnostic circuitry 36 is coupled to (broken) line 42 and therefore to one of the lines "To 18" on the top of fig. 2. There is no possibility to detect common mode signals because there is no reference to a ground terminal or a ground surface. This is not possible in a field device itself because a field device itself has (normally) no reference to ground surface. Therefore the statement of the Office

Action, mailed February 26, 2008, page 5, 2.2 is deemed not to be correct that common mode is simply the average of the two line signals. For the measurement of common mode signals there is necessary a reference to ground surface. This reference to ground surface only is possible after the connection of the bulk power supply to one or more of the number of fieldbuses.

Thirdly each field device 20 of the reference Eryurek et al. has its own power module 30. The present application in contrast discloses and claims that there is only one bulk power supply for all fieldbuses. That means that the number of field devices is the same number as is the number of power modules 30 according to the Eryurek et al. reference.

Therefore it is pointed out that the reference Eryurek et al. does not teach a diagnostic system for a modular fieldbus board carrying a number of fieldbuses connected to only one bulk power supply, comprising a monitoring transceiver means connected in use to two or more of the number of fieldbuses in which each connection to a fieldbus comprises two or more signal injection and/or signal detection points which points are collectively adapted to inject and/or detect both common mode and differential mode signals. It's one of the main features of the invention that these points are located between the bulk power supply and a fieldbus trunk part of the fieldbus.

Also it should be pointed out that the reference Eryurek et al., in Fig. 2, does not teach a number of specific detection points disposed within the hardware carried in each field device 20. The only point for measuring is the diagnostic circuitry 36 with its connection to line 42.

With respect to claim 13, Eryurek fails to specify fieldbus physical layer characteristics between two of the two or more of said points.

DelaCruz teaches, with respect to claim 13:

2) A diagnostic system (Fig 1 item 22) comprising a monitoring transceiver means connected to one or more of the number of fieldbuses (Fig 1) by means of two or more common mode and/or differential mode signal injection and/or signal detection points, which points are dispersed between the bulk power supply and the fieldbus trunk, such that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points (paragraph 0012).

The reference DelaCruz et al. teaches in paragraph 0015, lines 2 and 3: "tool 22 must not inject any energy into process control loop 18". Thus according to DelaCruz et al. the requirement of claim 13 of the instant application "by means of two or more common mode and/or differential mode signal injection ... points" is out. Therefore, a person of ordinary skill in the art applying the reference DelaCruz et al. would not obtain the present invention as claimed in claim 13 in view of the signal injection practiced according to claim 13.

Referring to the reference DelaCruz et al., the assembly is quite similar to the assembly of the reference Eryurek et al. Also the device of the reference DelaCruz

cannot measure common mode signals. It is not understood that the reference DelaCruz et al., page 2, paragraph 0012 shall communicate two or more signal injection and/or signal detection points, which points are collectively adapted to inject and/or detect both common mode and differential mode signals. Likewise, the reference DelaCruz et al., page 2, paragraph 0012, does not teach one of the main features of the present invention that these points are located between the bulk power supply and a fieidbus trunk part of the fieidbus. The physical assembly of field devices 20 of the reference DelaCruz et al. is not given and described in this document..

6. Claims 14-16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Eryurek and DelaCruz as applied to claim 13 above, and further in view of Westerfeld (WO 009945621). With respect to claims 14-16, Eryurek and DelaCruz fail to disclose a power supply converter and conditioner. One of ordinary skill in the art would have found it obvious to put power conditioning and/or conversion onboard such a module to eliminate noise and, especially

in the intrinsically safe environment of Eryurek, to prevent sparks or explosions. However, the examiner presents the following reference to show further this obviousness.

The references Eryurek et al. and DelaCruz et al. are respectfully traversed as above.

Westerfeld teaches, with respect to claim 14, power supply conversion (Fig 2 item 114) and power supply conditioning (Fig 2 item 1131-113n) in an intrinsically safe fieldbus (abstract) environment (Fig 1 item 1).

A power converter in the fieldbus context usually contains a voltage regulator to generate the desired fixed output voltage. A power conditioner in the fieldbus context generally contains a filter, which decouples the communication signal from the voltage.

The reference Westerfeld et al teaches a current limiting means (1131 to 113n) and a voltage limiting means (114). Neither the current limiting means (1131 to 113n) nor the voltage limiting means (114) of the Westerfeld et al. reference are suitable for generating a fixed output voltage and therefore no power supply converter is taught by the reference Westerfield et al.. As far a power conditioning is concerned, the circuit of the reference Westerfeld et al. does not contain any filter for decoupling and separating the communication signal from the voltage. Therefore no power conditioner is taught by the reference Westerfield et al.

It would have been obvious to one of ordinary skill in the art, as stated above to modify the apparatus of Eryurek and DelaCruz by including power conversion and conditioning.

Applicants respectfully submit that where three references Scecina et al., Eryurek et al., and Westerfeld et al. agree not to have a power supply converter and not to have a power conditioner, that then a person of ordinary skill in the art combining the three references would end up with a device without power supply converter and without power conditioner.

Both Eryurek and Westfeld present the importance for intrinsic safety of such conversion to prevent an accident due to sparking or other power-related issues.

With respect to claims 15-16, the examiner has given these claims the broadest reasonable interpretation. The examiner maintains that these claims may be interpreted as "common mode signal detection points" being merely points within the system capable of being monitored with an injected or detected signal. The examiner maintains that, under this interpretation, since reference Westerfeld discloses such components connected to each other, these points do exist though they are not being actively monitored.

The reference Westerfeld et al. WO99/45621 is far away from the present invention. This reference relates to a field bus system with a field bus distributor 11 to be mounted in an area endangered by explosions 1 to feed a plurality of field equipment 121 to 12n arranged in an area endangered by explosions 1 through intrinsically safe circuits 13. The field bus system comprises at least one high energy voltage source 21 arranged in an area not endangered by explosions 2. To this end, a field bus coupler 22 with three galvanically separated circuits is provided in the area

not endangered by explosions 2. The field bus coupler 22 is connected to a field bus backbone 23 that is guided by the first circuit in the area not endangered by explosions 2. The voltage source 21 is connected to the field bus coupler 22.

Reconsideration of all outstanding rejections is respectfully requested.

All claims as presently submitted are deemed to be in form for allowance and an early notice of allowance is earnestly solicited.

Respectfully submitted,

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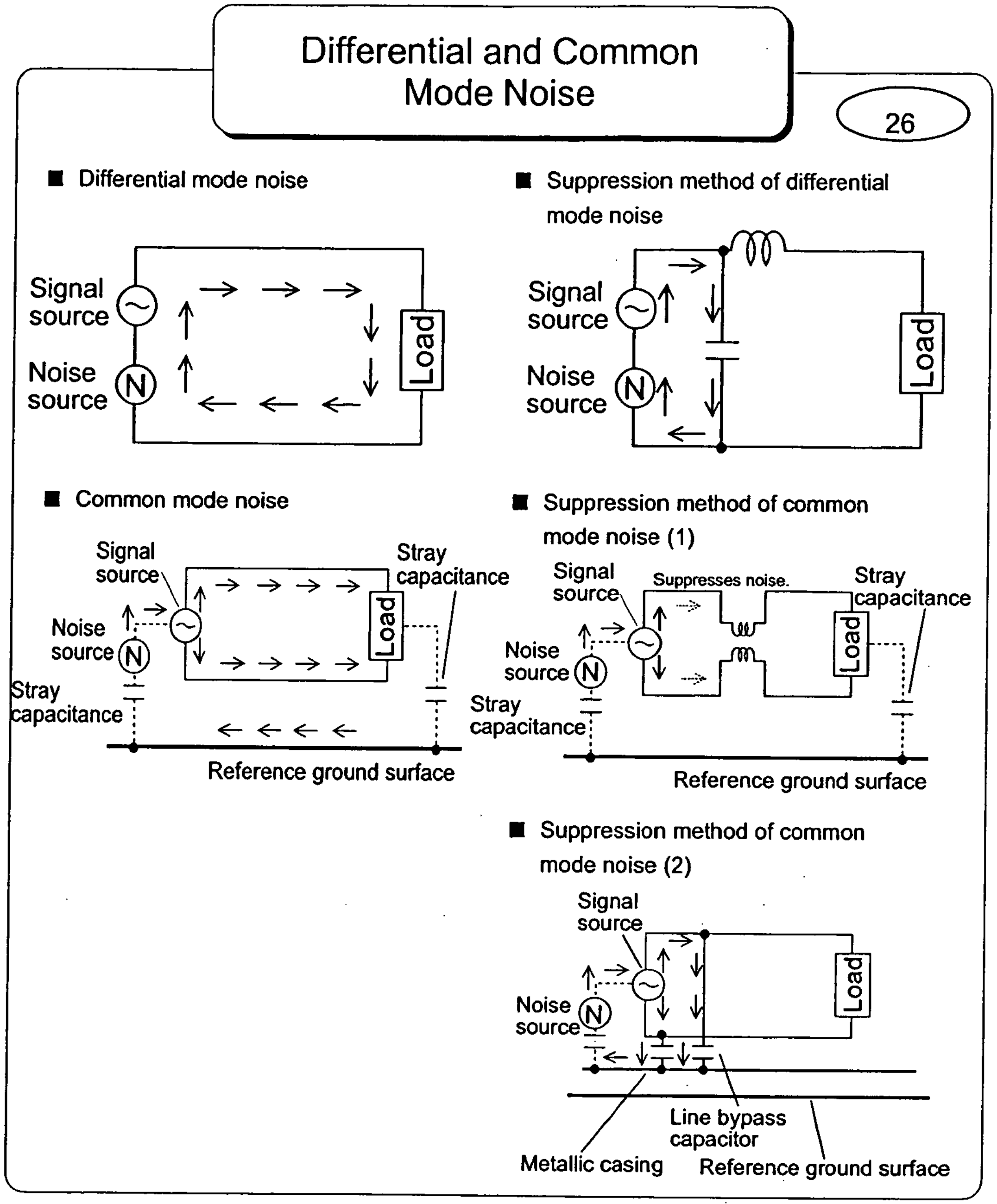
4. Other Filters

4.1. Differential and Common Mode Noise



Noise is classified into two types according to the conduction mode.

The first type is differential mode noise which is conducted on the signal (VCC) line and GND line in the opposite direction to each othe. This type of noise is suppressed by installing a filter on the hot (VCC) side on the signal line or power supply line, as mentioned in the preceding chapter.

The second type is common mode noise which is conducted on all lines in the same direction. With an AC power supply line, for example, noise is conducted on both lines in the same direction. With a signal cable, noise is conducted on all the lines in the cable in the same direction.

Therefore, to suppress this type of noise, EMI suppression filters are installed on all lines on which noise is conducted.

In the examples shown above, the following two suppression methods are applied.

1. Noise is suppressed by installing an inductor to the signal line and GND line, respectively.
2. A metallic casing is connected to the signal line using a capacitor. Thus, noise is returned to the noise source in the following order; signal/GND lines → capacitor → metallic casing → stray capacitance → noise source.

4. Other Filters

4.2. Noise Suppression by Common Mode Choke Coils

Noise Suppression by Common Mode Choke Coils (1)

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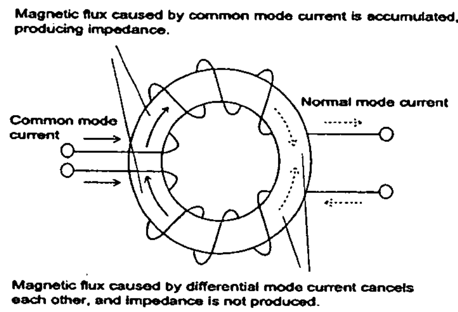
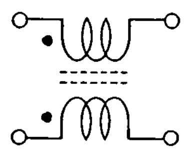
Common mode choke coils work as a simple wire against differential mode current (signal), while they work as an inductor against common mode current (noise).

(a) Structure



(b) Equivalent circuit

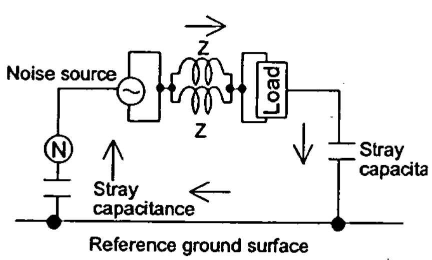


(c) Effect against common mode noise

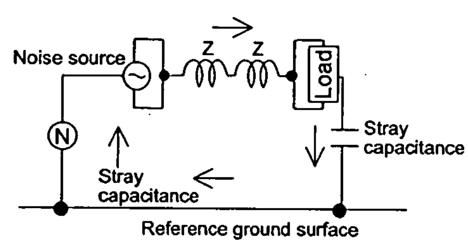
Since magnetic flux caused by common mode current is accumulated, a high amount of impedance is produced.

⇨ Common mode choke coils are suited for common mode noise suppression because a coil with large impedance is easily achieved.

(1) When two normal inductors are used



(2) When a common mode choke coil is used



Common mode choke coils are used to suppress common mode noise. This type of coil is produced by winding the signal or supply wires one ferrite core.

Since magnetic flux flows inside the ferrite core, common mode choke coils work as an inductor against common mode current. Accordingly, using a common mode choke coil provides larger impedance against common mode current and is more effective for common mode noise suppression than using several normal inductors.

[Notes]

4. Other Filters

4.2. Noise Suppression by Common Mode Choke Coils

Noise Suppression by Common Mode Choke Coils (2)

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(d) Effect on differential mode current

Since magnetic flux caused by differential mode current cancels out, impedance is not produced.

⇨ A decrease in impedance due to magnetic saturation does not easily occur, even if the current flow is large.

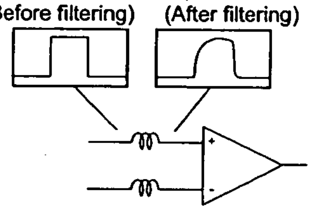
Common mode choke coils are suited for noise suppression on lines with large current flows, such as AC/DC power supply lines.

⇨ The distortion of the waveform is less.

Common mode choke coils are suited for noise suppression on lines where signal waveform distortion causes a problem, such as video signal lines.

(1) When two inductors are used

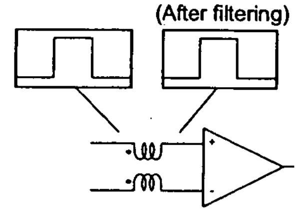
Input waveform (Before filtering) Output waveform (After filtering)



The distortion of the waveform is large

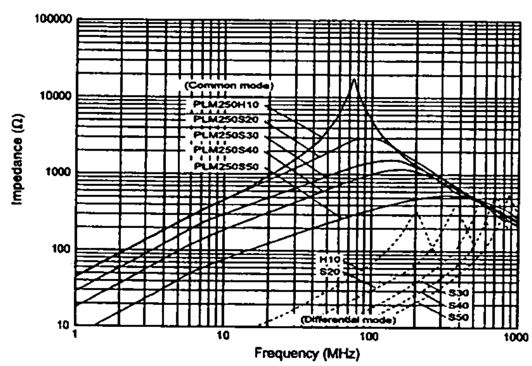
(2) When a common mode choke coil is used

Output waveform (After filtering)



The distortion of the waveform is small

(e) Examples of impedance characteristics of DC common mode choke coils



Since magnetic flux cancels out inside the ferrite core, impedance is not produced for differential mode current. The magnetic saturation problem is small. Common mode choke coils are suited for common mode noise suppression on lines with large current flow, such as AC/DC power supply lines. Since they do not affect signal waveform, they are also suited for common mode noise suppression on lines where signal waveform distortion causes a problem, such as video signal lines.

The above graph shows examples of impedance characteristics of DC common mode choke coils. Actual characteristics also contain differential mode impedance, and this must be considered when using common mode choke coils in circuits where the signal waveform is significant.

[Notes]